

REPORT BY THE U.S.

General Accounting Office

Status Of Strategic Petroleum Reserve Activities As Of March 31, 1984

The Department of Energy reported that the Strategic Petroleum Reserve contained about 391.8 million barrels of oil on March 31, 1984. During the second quarter of fiscal year 1984, about 12.7 million barrels of oil were added for a fill rate of about 140,000 barrels per day.

This report discusses the progress being made in filling, developing, and operating the Reserve. It also discusses other events and activities affecting the Reserve that occurred during the second quarter of fiscal year 1984.



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WASHINGTON, D.C. 20548

RESOURCES, COMMUNITY,
AND ECONOMIC DEVELOPMENT
DIVISION

B-208196

The Honorable James A. McClure
Chairman, Committee on Energy and
Natural Resources
United States Senate

The Honorable J. Bennett Johnston
Ranking Minority Member, Committee
on Energy and Natural Resources
United States Senate

On March 25, 1982, the Senate Committee on Energy and Natural Resources requested that we report on a quarterly basis, through fiscal year 1985, on the Department of Energy's (DOE's) progress in filling the Strategic Petroleum Reserve (SPR) and in complying with the requirements of applicable law. This is the eighth quarterly report. A list of our prior reports is contained in table 12 in appendix III.

This report discusses events and activities related to the administration's progress in filling, developing, and operating the SPR during the second quarter of fiscal year 1984. Specifically, it notes that during the quarter:

- The administration released its fiscal year 1985 budget proposal which requests funds to (1) fill the SPR at a rate of 145,000 barrels of oil per day, which will fill 482 million of the 496 million barrels of available storage capacity, and (2) construct the new storage site at Big Hill, Texas.
- DOE added about 12.7 million barrels of oil at an average fill rate of 140,000 barrels per day, bringing the total oil in the SPR to about 391.8 million barrels.
- A brine pipeline break at the Bryan Mound, Texas, storage site and preparation for an oil movement test at the West Hackberry, Louisiana, storage site slowed the effort to expand underground storage capacity.

- DOE paid about \$512 million for oil acquisition and transportation, had unpaid obligations of about \$1.4 billion, and had about \$447 million in unobligated funds available for additional oil purchases.
- Several activities occurred relating to the SPR's drawdown capability:
 - DOE's SPR Distribution Readiness Exercise assessment team released its report which made 85 recommendations to improve SPR drawdown decisionmaking and the process of selling and distributing oil.
 - DOE conducted a successful oil movement test at West Hackberry by withdrawing 1,058,000 barrels of oil in a 24-hour period and moving it 43 miles by pipeline to storage tanks at the Sun Oil Company terminal at Nederland, Texas.
 - Parent companies sold one and conditionally agreed to sell another of the three privately owned crude oil pipelines that DOE planned to use to move oil to the Midwest in the event of a drawdown. Once the transactions are complete, the new owners will convert the pipelines to carry natural gas. As part of its study of the adequacy of the SPR oil drawdown and distribution systems, DOE is assessing the impact of these transactions.
- Several actions were taken that affected DOE personnel and contractors in New Orleans, Louisiana:
 - DOE reassigned the manager of the SPR Project Management Office, and it agreed to eliminate 4 vacant positions and downgrade 14 other positions in a partial response to an Office of Personnel Management grade structure study.
 - DOE announced its intention to solicit bids for a management, operations, and maintenance contractor to be hired for 5 years beginning April 1, 1985. The new contractor will replace several current SPR contractors by consolidating their responsibilities.
 - The current operations and maintenance contractor, Petroleum Operations and Support Services, Inc., submitted an estimate of \$264 million for the cost of its base contract and two 6-month extensions, which is \$71 million more than the original estimate. According to a DOE contracts specialist, the primary reason for the cost increase is that DOE has issued about 150 technical directives for additional work.

This report also presents information on other SPR issues. These include (1) the DOE Oak Ridge Operations Office's efforts to implement the recommendations of the October 1983 SPR baseline assessment report and the March 1984 release of its report on allegations about mismanagement and misconduct within the SPR program, (2) the results of a U.S. Attorney/DOE Inspector General investigation into allegations that, between November 1977 and December 1978, SPR oil was diverted and inferior or waste oil was substituted, and (3) the SPR program's compliance with the Cargo Preference Act of 1954 (46 U.S.C. 1241(b)). (See app. I for more details.)

In addition, appendix II discusses DOE's efforts to assess three alternative SPR oil acquisition strategies: direct contracts with the national oil companies of oil producing countries, using Elk Hills Naval Petroleum Reserve oil, and using federal royalty oil. Appendix III presents tables and figures supporting the discussion of SPR activities during the quarter.

OBJECTIVES, SCOPE, AND METHODOLOGY

This report provides information on SPR activities which occurred during the quarter ending March 31, 1984. The report is necessarily limited, because of the time allowed, to providing primarily statistical information and highlights of major activities that occurred during the period covered. Separate reviews are underway or planned that will address in detail various aspects of the SPR program.

This report is based, in part, on our review of DOE program documents, publications, and studies. In addition, we interviewed managers and operating personnel responsible for planning and managing activities associated with the development and operations of the SPR facilities. We also interviewed employees from the DOE contractors that carry out most project activities. We obtained information on the availability and use of SPR funds from both DOE and the Defense Fuel Supply Center, DOE's purchasing agent for most of the SPR oil.

Except as noted below, our review was performed in accordance with generally accepted government auditing standards. We did not verify the volumes or quality of oil that DOE received nor the available capacity of SPR storage facilities because the effort that would be required to do so was beyond the scope of work for this report.

We did not obtain official agency comments because of the required time frame for issuing this report. However, we provided DOE and Defense Fuel Supply Center program officials with a draft of this report, discussed its factual accuracy with them, and made appropriate revisions.

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B-208196

As arranged with your office, we plan no further distribution of this report until 7 days after the issue date, unless you publicly announce its contents earlier. At that time, we will provide copies to the Secretary of Energy and other interested parties and make copies available to the public upon request.

A handwritten signature in cursive script, appearing to read "Ralph Kardone for".

J. Dexter Peach
Director

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ABBREVIATIONS

DFSC	Defense Fuel Supply Center
DIREX-B	Distribution Readiness Exercise, Phase B
DOE	Department of Energy
GAO	General Accounting Office
NPR	Naval Petroleum Reserve
OCS	outer continental shelf
OPM	Office of Personnel Management
PEMEX	Petroleos Mejicanos
POSSI	Petroleum Operations and Support Services, Inc.
SPR	Strategic Petroleum Reserve

STATUS OF STRATEGIC PETROLEUMRESERVE ACTIVITIES AS OF MARCH 31, 1984

The Energy Policy and Conservation Act (Public Law 94-163, Dec. 22, 1975) authorized the creation of a Strategic Petroleum Reserve (SPR) to store up to one billion barrels of oil. To meet the act's goals, the Department of Energy (DOE) is implementing a three-phase plan to store 750 million barrels of oil. Phase I of this plan, the storage of about 260 million barrels of oil, is complete. It consisted of acquiring and modifying for oil storage existing caverns in salt deposits at Bryan Mound, Texas; Bayou Choctaw, Sulphur Mines, and West Hackberry, Louisiana; and a salt mine at Weeks Island, Louisiana, as well as construction of an oil receiving terminal at St. James, Louisiana. Phase II is scheduled for completion in 1987. It involves creating new caverns through a leaching program at three of the phase I sites to increase SPR capacity to about 550 million barrels. The leaching program entails pumping water into salt deposits and removing the resultant brine. DOE injects oil into the top of the cavern as the leaching process creates the storage capacity. Phase III involves creating additional capacity to reach the 750 million barrel goal by expanding three existing storage sites and developing a new site at Big Hill, Texas. Because of the time needed to develop capacity, activities associated with phase II and phase III overlap.

On June 15, 1983, the Secretary of Energy announced the reorganization of the SPR management. Responsibility for project direction was transferred from the Project Management Office (Project Office) in New Orleans to the Oak Ridge Operations Office (Operations Office) in Oak Ridge, Tennessee.

This appendix discusses activities during the quarter ending March 31, 1984, that affect the SPR, including (1) the administration's SPR budget proposal for fiscal year 1985, (2) the activities associated with adding 12.7 million barrels of oil to the SPR during the quarter, (3) the cavern leaching program at the SPR storage sites, (4) the status of the SPR oil acquisition and transportation account, (5) activities related to the SPR drawdown capability, and (6) changes affecting SPR Project Office personnel and SPR contractors. This appendix also provides information about the implementation of the recommendations made in the Operations Office baseline report, the conclusions of the Operations Office report on allegations about mismanagement or misconduct within the SPR program, the results of a U.S. Attorney/DOE Inspector General investigation into allegations that inferior or waste oil was substituted for SPR oil, the Project Office's program to analyze the oil in filled storage caverns, and the SPR program's compliance with the Cargo Preference Act of 1954 (46 U.S.C. 1241(b)). Appendix III presents supporting tables and figures.

THE FISCAL YEAR 1985 SPR BUDGET PROPOSAL

For fiscal year 1985, the administration proposes to fill the SPR at an average rate of 145,000 barrels per day. This fill rate, in addition to the achievement of the legislated fiscal year 1984 minimum fill rate of 186,000 barrels per day, would result in a total of 482 million barrels of oil in the SPR by the end of fiscal year 1985. According to the administration's budget, DOE will have permanent storage capacity for 496 million barrels of oil by the end of fiscal year 1985, leaving 14 million barrels of unused capacity. (See figure 1 and table 1 in app. III.)

To fill the SPR at 145,000 barrels per day in fiscal year 1985 and to provide funding for the first 6 months of oil deliveries in fiscal year 1986 at an average rate of 145,000 barrels per day, the administration has proposed an oil acquisition and transportation budget of \$1.9 billion.¹ The amount is based on the administration's estimate that the average barrel of oil delivered to the SPR will cost \$31.11 in fiscal year 1984, \$30.79 in fiscal year 1985, and \$30.87 in fiscal year 1986.

If the SPR oil acquisition objective were to fill the SPR to capacity in each fiscal year, instead of the administration's proposed 145,000 barrels per day rate, the average fill rate would be 189,000 barrels per day in fiscal year 1984, 181,000 barrels per day in fiscal year 1985 and 142,000 barrels per day in fiscal year 1986.² We estimate, based on the DOE budget's average per barrel oil cost estimates, that about \$421 million would have to be added to the administration's proposed SPR oil acquisition and transportation budget for fiscal year 1985 to achieve a fill-to-capacity goal.

The administration also proposed a fiscal year 1985 budget of \$459.2 million for SPR storage facilities development and operations, planning and management support, and program direction. The proposed budget includes \$324 million for phase III storage facility development, of which \$289.1 million is for construction activities at the Big Hill Storage site. The budget states that DOE expects to achieve a \$12 million reduction by management savings through procurement and financial systems reform.

SPR OIL FILL

DOE reported that about 12.7 million barrels of oil were added to the SPR during the quarter ending March 31, 1984, for an

¹The administration and the Congress have agreed to the 6 months forward appropriation to ensure continuity in the SPR oil acquisition program.

²The administration's fiscal year 1985 budget estimates that there will be 548 million barrels of storage capacity by the end of fiscal year 1986.

average fill rate of about 140,000 barrels per day. This brought the total SPR inventory to about 391.8 million barrels as of March 31, 1984. Figure 2 and tables 2 through 5 in appendix III provide further information on the SPR oil fill activities.

About 4.2 million barrels, or 33 percent, of the oil delivered in the quarter came from the 1981 contract with Petroleos Mexicanos (PEMEX), the Mexican national oil company. About 6.9 million barrels, or 54 percent, came from contracts awarded under the Defense Fuel Supply Center's (DFSC's) open, continuous solicitation,³ and about 1.6 million barrels, or 13 percent, came from deliveries under term contracts that DFSC awarded in fiscal year 1983. Of the oil delivered this quarter, about 0.6 million barrels, or 5 percent, was Maya oil that is part of the PEMEX contract oil deliveries; about 5.2 million barrels, or 41 percent, was sour crude; and about 6.9 million barrels, or 54 percent, was sweet crude.⁴

During the quarter, DFSC awarded 12 contracts, totaling about 12.3 million barrels, through the open, continuous solicitation. DOE has requested DFSC to purchase an additional 10.9 million barrels of oil for delivery during the next quarter.

DEVELOPING STORAGE CAPACITY

During the quarter, DOE experienced both planned and unexpected delays in its phase II storage capacity leaching program at West Hackberry and Bryan Mound. At West Hackberry, the leaching program was shut down for scheduled maintenance for 2 weeks in late January. It was subsequently shut down for 4 days in February to prepare for and execute an oil movement test. At Bryan Mound, leaching was interrupted for about 10 days because of an onsite brine pipeline failure and for about 2 days because of a small oil spill. (See tables 6 and 7 in app. III.)

On February 24, 1984, DOE began leaching the first two phase III caverns. These are two of the four phase III caverns at Bryan Mound. For the Big Hill site, DOE awarded a contract for surface construction associated with the first five caverns on December 30, 1983. DOE issued an invitation for bids for drilling wells for the other nine caverns which will close on April 27, 1984.

³The open, continuous solicitation is a mechanism DFSC--the purchasing agent for most of the SPR oil--uses to purchase SPR oil. It involves the use of a purchasing solicitation which is not reissued but rather remains open, allowing offers of oil to be made about every 2 weeks. The offers usually involve oil that is available on the "spot," or short-term, market.

⁴DOE established quality specifications for SPR oil which include a maximum of 3.5 percent sulfur content for Maya crude, a range from .5 percent to 1.99 percent sulfur for sour crudes, and a maximum of .5 percent sulfur for sweet crudes.

West Hackberry

In late January, the cavern leaching program was stopped for 2 weeks because of a planned shutdown for maintenance. The maintenance shutdown was the first planned shutdown since DOE resumed filling the SPR in September 1980. Maintenance activities included replacing or repairing valves, servicing electrical transformers, cleaning and calibrating meters and other instruments, replacing sections of deteriorated pipe, and cleaning the brine ponds. The cavern leaching program also was shut down for 2 days for a rehearsal test on February 24, 1984, and 2 days for an oil movement test on February 28-29, 1984. The brine disposal rate for the quarter averaged 738,000 barrels per day as compared to the baseline brine disposal rate of 900,000 barrels per day.⁵

Well drilling for the West Hackberry phase III cavern began on January 4, 1984, and was completed on March 6, 1984. DOE plans to award the surface construction contract in June 1984.

Bryan Mound

The Bryan Mound cavern leaching program was interrupted twice this quarter because of an onsite brine pipeline break and an oil spill. The brine disposal rate for the quarter averaged 678,000 barrels per day as compared to the baseline brine disposal rate of 900,000 barrels per day.

On January 30, 1984, a main (36-inch) brine pipeline ruptured due to corrosion. The pipeline carried brine from 6 phase II caverns to the site's brine pond. (The brine pond is used to settle out salt solids before the brine is disposed of in the Gulf of Mexico.) The brine pipeline was excavated, repaired, and put back into service. However, it subsequently ruptured two more times in different locations. DOE decided to abandon the brine pipeline and use a previously abandoned phase I 20-inch brine pipeline to carry brine from the caverns to the brine pond. The 20-inch pipeline was tested and accepted, and the cavern leaching resumed by February 13, 1984.

During the remainder of the quarter, the brine disposal flow rate was reduced to check the new pipeline's serviceability. DOE plans to return to the normal brine disposal flow rate in the first week in April 1984. DOE also plans to test the 20-inch pipeline every 2 weeks. DOE operations personnel stated that the brine disposal pipeline arrangement should suffice to complete the phase II cavern leaching--two caverns are complete, three are scheduled for completion by June 1984, and the last cavern is scheduled for completion in February 1985.

⁵DOE uses the cavern leaching baselines to project the SPR's permanent storage capacity. The baselines include a 10 percent contingency for both planned and unplanned interruptions or slowdowns.

DOE is testing the other brine pipelines at Bryan Mound and West Hackberry to determine the extent of corrosion damage. The initial test on the other main brine pipeline at Bryan Mound which services six phase II and four phase III storage caverns showed that in some places the wall thickness had experienced a 50 percent corrosion loss. However, DOE expects the pipeline to remain serviceable with up to 60 percent corrosion loss. The DOE assistant project manager for operations said that, even with the brine pipeline problems, the cavern leaching program is expected to continue about on schedule without delaying phase II cavern completions.

On February 28, 1984, a valve nipple was accidentally knocked off during maintenance work, resulting in an estimated 200 barrel oil spill. The site was shut down for 2 days because oil sprayed out and was carried by the wind to the site's electrical transformer, which had to be shut off in order to be cleaned. About half of the spilled oil was recovered.

On February 24, 1984, DOE began leaching the first two of four phase III caverns at Bryan Mound. DOE plans to start leaching the other two caverns on June 1, 1984. Even though the sites' phase III program leaching is behind schedule by several months, the assistant project manager for operations said that he expects that the cavern leaching and oil fill schedule will be achieved.

Big Hill

On December 30, 1983, DOE awarded a contract to Fruin-Colnon Corporation for surface construction associated with the first five phase III caverns. On February 24, 1984, DOE gave Fruin-Colnon a limited notice to proceed with site clearing for office and maintenance buildings. DOE plans to remove the limitation after it has agreed on a specific construction schedule for cavern piping. DOE issued an invitation for bids for drilling wells for the remaining nine caverns which will close on April 27, 1984. DOE has eight active, long-lead equipment contracts for Big Hill.

STATUS OF SPR FUNDING

During the quarter, DOE made payments of about \$512 million for oil acquisition and transportation. DOE estimated the unpaid obligations as of March 31, 1984, to be about \$1.4 billion. DOE had about \$447 million available as unobligated funds as of March 31, 1984. Table 8 provides further information on the status of the SPR Petroleum Account.

ACTIVITIES RELATED TO SPR DRAWDOWN READINESS

During the quarter several events occurred that affect SPR drawdown readiness. In February 1984, DOE released its assessment report on the SPR Distribution Readiness Exercise, Phase B (DIREX-B), that was conducted from July 11, 1983, to August 19,

1983. On February 28, 1984, DOE tested the drawdown capability at the West Hackberry storage site by moving 1,058,000 barrels of oil from the site to storage tanks at the Sun marine terminal at Nederland, Texas. This was the third successful oil movement test that DOE has conducted during the past 9 months. On February 29, 1984, the crude oil pipeline that connected the Bryan Mound SPR storage site to the Midwest was sold. On April 4, 1984, the shareholders conditionally agreed to sell the crude oil pipeline that connects the West Hackberry, Sulphur Mines, and Big Hill SPR storage sites to the Midwest. Once the transactions are complete, both pipelines will be converted to carry natural gas and will no longer be available to the SPR. DOE currently is assessing the adequacy of the SPR drawdown and distribution systems. This assessment was started before DOE learned about the potential pipeline sales. DOE subsequently modified the scope of its study to include an analysis of alternative distribution channels to reach commercial oil transportation networks. It plans to address any required changes as part of the fiscal year 1986 budget process.

DIREX-B assessment

As we reported previously,⁶ DOE conducted DIREX-B from July 11, 1983, through August 19, 1983, to test the SPR's drawdown, sales, and distribution procedures. DOE's objectives were to (1) evaluate the management and administration of the DOE/SPR emergency response procedures, (2) familiarize DOE managers with the roles they would perform and the circumstances they would face in an emergency, and (3) identify changes needed to improve the response procedures. The test did not involve any actual oil movements.

The exercise simulated a "crisis" situation in which a sudden, unexpected and severe loss of world crude oil supplies (about 10.4 million barrels per day) had occurred. The exercise then proceeded through the day-to-day activities that would take place in a real oil shortage emergency. These activities included (1) the decisionmaking process to determine whether to use and to what extent the SPR should be used to mitigate the simulated oil shortage, (2) the SPR oil sale, including issuing notices of sale, evaluating simulated bids, and awarding offers to purchase the oil, and (3) the simulation of the oil distribution system, including establishing delivery schedules and custody transfer procedures.

There were three major organizational components for the exercise: (1) a management and administrative staff made up of DOE employees and contractors who participated in the response activities, (2) an exercise control team of about 16 DOE personnel located in Washington, D.C., and the SPR Project Office in New Orleans who updated the crisis scenario and simulated outside

⁶Status of Strategic Petroleum Reserve Activities as of September 30, 1983 (GAO/RCED-84-11, Oct. 14, 1983).

participation by other federal and state agencies, private citizens, and organizations, and (3) an assessment team comprised of 5 employees from DOE and the Department of the Interior and 3 private consultants.

In February 1984, the assessment team issued its report to the Secretary of Energy.⁷ The assessment was based on an after-the-fact review of documents, briefings, interviews, and several visits to the SPR Project Office and several storage and distribution facilities. The report concluded that DIREX-B was useful for testing and evaluating the SPR emergency response readiness, training people, and identifying deficiencies. However, because of the limited scope of the exercise, it did not test the overall capability to respond to an energy emergency. (Participation in the test was limited to DOE, which used the exercise control team to simulate external participation in order to provide some realism to the test.) The report made 85 recommendations for improving the decisionmaking, sales, and distribution processes of the emergency response as well as for improving the design and implementation of future exercises.

SPR oil movement tests

During the past 9 months, DOE has conducted three 24-hour tests to demonstrate the capability to move oil from storage caverns into the SPR pipeline system at the design drawdown rates. The tests, at Bayou Choctaw, Bryan Mound, and West Hackberry, moved a total of about 2.3 million barrels of crude oil. We observed these exercises as part of our ongoing assignment to evaluate the SPR system's drawdown capability. Representatives from the Operations Office and the Inspector General's Office also assessed the exercises.

Bayou Choctaw

DOE conducted the oil movement test at Bayou Choctaw on July 11-12, 1983, to demonstrate the capability to draw down oil from the site's caverns at the phase I design rate of 240,000 barrels per day. During the 24-hour test, a total of 249,000 barrels of crude oil were moved from one site cavern through the SPR pipeline to storage tanks at the St. James marine terminal.

Bayou Choctaw site activities were shut down briefly to change over several pumps and valves from a leaching to a drawdown mode.⁸ The equipment subsequently was brought back online, and leaching continued simultaneously with the oil movement test.

⁷Strategic Petroleum Reserve Distribution Readiness Exercise (DIREX-B)--Assessment Report.

⁸Water is pumped from a river or canal and injected into a cavern to dissolve salt and create cavern volume during the leaching process and to displace oil during the drawdown process.

The Inspector General's report on the test⁹ stated that the draw-down goals were achieved without any major equipment problems. However, the report questioned whether one standby brine/raw water injection pump is sufficient backup and stated that modifications will be needed to the onsite piping if phase II and phase III drawdown capacity of 480,000 barrels per day is to be achieved.

Bryan Mound

DOE conducted the 24-hour oil movement test at Bryan Mound on November 3-4, 1983, to demonstrate the capability to draw down oil from the site's caverns at a rate of 1 million barrels per day. DOE began preparing for the exercise about 3 weeks before the actual demonstration and conducted a rehearsal on October 28, 1983.

The actual test began on November 3, when DOE manually brought equipment components online, beginning with the raw water intake pumps and then other pumps down the line. During the test 1,007,000 barrels of oil were moved from eight caverns to storage tanks at Bryan Mound and the Seaway terminal's Jones Creek tank farm. No major equipment problems occurred to impede the exercise. However, DOE used one more raw-water pump (four in all) than it anticipated because of low tide levels and silting at the intake structure.

This test demonstrated the capability to move oil at a rate close to the phase II and phase III design rate of 1,054,000 barrels per day. However, the Inspector General's report¹⁰ on the test cautioned that inadequate maintenance of the site's systems and equipment could make a sustained drawdown costly and laborious.

West Hackberry

DOE conducted a 24-hour oil movement test at West Hackberry on February 28-29, 1984, to demonstrate the capability to drawdown oil from the site's caverns at a rate of 1 million barrels per day. During the test 1,058,000 barrels of oil were moved from eight caverns through the SPR pipeline to storage tanks at the Sun marine terminal. No major problems occurred to impede the exercise.

DOE began preparing for the test about a month in advance and conducted a rehearsal on February 24. Unlike the Bayou Choctaw

⁹Drawdown Reliability of the Bayou Choctaw Site of the Strategic Petroleum Reserve (DOE/IG-0197, Sept. 28, 1983).

¹⁰Drawdown Reliability of the Strategic Petroleum Reserve's Bryan Mound Site (DOE/IG-0204, March 21, 1984).

and Bryan Mound tests, which started from a stop position, the West Hackberry drawdown system had begun moving oil in advance and was pumping at a rate of about 45,000 barrels per hour when the test began. This rate generally was continued throughout the test period.

Oil pipeline sales

In our last two quarterly reports, we discussed Seaway Pipeline, Inc.'s effort to sell the marine terminal that DOE uses to fill the Bryan Mound storage site and the crude oil pipeline that connects the terminal to refineries in Cushing, Oklahoma. On February 29, 1984, Seaway Pipeline, Inc., sold the crude oil pipeline to Phillips Petroleum Company. Transfer of ownership is scheduled for May 1, 1984. According to a Phillips Petroleum Company executive, Phillips will convert the pipeline to carry natural gas. The pipeline will no longer be available to DOE to move oil to the Midwest in the event of an SPR drawdown. DOE's contract to use the Seaway marine terminal extends through 1986.

In March 1984, Houston Natural Gas Corporation made an unsolicited offer to buy Texoma Pipeline Company's crude oil pipeline that runs from southeastern Texas to northern Oklahoma. Texoma's shareholders conditionally approved the sale on April 4, 1984. The President of Texoma Pipeline Company said that, barring any unforeseen circumstances, the sale is expected to be completed in the summer or early fall. Houston Natural Gas Corporation intends to convert the pipeline to carry natural gas. The sale of the Texoma crude oil pipeline affects the SPR drawdown capability because it is the major pipeline that DOE planned to use to move SPR oil from the West Hackberry, Sulphur Mines, and Big Hill storage sites to the Midwest.

According to DOE's deputy assistant secretary for the SPR, the sale of the Seaway pipeline and the expected sale of the Texoma pipeline will not have an impact on the phase I SPR drawdown rate of 1.7 million barrels per day. However, he noted that the Seaway pipeline sale will affect the Bryan Mound phase II drawdown capacity which is scheduled to come online in late 1986 and the Texoma pipeline sale will affect the Big Hill phase III drawdown capacity which is scheduled to come online at the end of 1990.

DOE assessment of the SPR drawdown and distribution system

On November 7, 1983, the Secretary of Energy requested the National Petroleum Council to study the types of crude oil stored in the SPR, capabilities to transport the oil from SPR storage sites to refineries, and long-term availability and movement patterns of tankers. In March 1984, the Secretary's designee approved the council's committee, which met for the first time on April 3, 1984. The committee approved the creation of task groups on SPR facilities, refineries, distribution, and marine. Table 9 in appendix III lists the subjects that each group will assess for 1983 and 1990. The committee plans to issue its final report to the Secretary of Energy by December 1984.

In addition, in response to questions by the Chairman, Subcommittee on Energy, Nuclear Proliferation and Government Processes, Senate Committee on Governmental Affairs, DOE reported that it plans to address in the fiscal year 1986 budget process the adequacy of current SPR distribution capabilities and whether any changes may be appropriate. DOE currently is conducting (1) a cost/benefit analysis of the current design drawdown rate criterion of 4.5 million barrels per day to determine whether it should be retained or changed in view of the market outlook, (2) an assessment of possible future trends in U.S. refiners' use of imported oil, and (3) an engineering analysis of individual site drawdown capabilities and their relationship to an overall SPR drawdown and distribution system, including alternative methods to distribute oil from the SPR storage sites to the petroleum industry.

CHANGES AFFECTING PROJECT OFFICE PERSONNEL AND SPR CONTRACTORS

During the quarter several actions were taken that affected DOE personnel and contractors. These actions included the (1) reassignment of the Project Office's manager, (2) initial Operations Office response to the Office of Personnel Management's (OPM's) August 1983 report on the grade structure for Project Office personnel, (3) Operations Office announcement of its intention to hire an SPR management, operations, and maintenance contractor for a 5-year period beginning April 1, 1985, and (4) February 1984 cost estimates by Petroleum Operations and Support Services, Inc. (POSSI), the SPR operations and maintenance contractor, for its activities during the base contract period plus two 6-month extensions.

Project Office manager

The Operations Office announced that, effective March 19, 1984, the Project Office manager was reassigned to the effort to terminate the Clinch River Breeder Reactor program. However, he will continue to advise the new Operations Office assistant manager for the SPR on special projects. The Project Office's deputy manager was named the acting Project Office manager.

Project Office grade structure

In August 1983, OPM issued a report on its evaluation of the grade structure for DOE employees at the Project Office. The report recommended that 21 positions be downgraded, 1 position be reclassified to a new occupation, and 42 positions be reviewed by DOE. The Project Office is assessing the report's recommendations and plans to complete its review of the affected positions and of related jobs by the end of fiscal year 1984. The Operations Office has assigned one personnel specialist to assist the Project Office in this effort.

The Project Office review is divided into six parts. Three parts have been completed and have received OPM concurrence on the following actions taken for 25 positions reviewed:

- 4 vacant positions were abolished,
- 3 vacant positions were downgraded,
- 11 encumbered positions were downgraded (notice has been given),
- 1 position was reclassified to a new occupation,
- 5 recommended downgrades were rebutted, and
- 1 classification was sustained by OPM.

Of the 15 procurement division and finance division positions in these three parts, 11 were downgraded, 3 recommended downgrades were rebutted, and 1 vacancy was abolished. The Project Office submitted its report on the fourth part of the review on March 21, 1984, and is awaiting OPM's response. Of the 10 positions reviewed:

- 3 encumbered positions were tentatively downgraded,
- 1 recommended downgrade was rebutted,
- 3 classifications were tentatively sustained by OPM,
- 1 new classification was submitted for approval, and
- 2 positions were deferred to May 4, 1984, for additional review.

The fifth part of the review covers 13 positions, 5 of which have already been reviewed and concurred in by OPM. These included two encumbered positions that were downgraded and three classifications that OPM sustained. The Project Office will report its findings on the remaining eight positions to OPM by May 31, 1984.

The final part of the review covers 20 positions, two of which have already been reviewed for recruitment purposes and concurred in by OPM. These included one recommended downgrade which was rebutted and one classification which OPM sustained. The Project Office will report its findings on the remaining 18 positions to OPM by August 31, 1984.

After it completes the classification review, the Project Office plans to conduct an extensive SPR organization review with a report scheduled for March 1985. We will report the results of Project Office classification and organization reviews in future quarterly reports.

Management, operations,
and maintenance contract

As discussed in our last quarterly report,¹¹ the Operations Office plans to replace several current SPR contractors by consolidating their responsibilities under a management, operations, and maintenance contractor. On March 14, 1984, the Operations Office announced its intention to issue a request for proposals in early April for a 5-year, cost-plus-award-fee-contract. The Operations Office plans to close the solicitation on July 18, 1984, and to select a contractor in December 1984. The new management, operations, and maintenance contractor would begin phasing in on February 1, 1985, and would formally take over responsibilities on April 1, 1985.

POSSI contract cost estimate

POSSI took over SPR operations and maintenance responsibilities in January 1982. Its contract is scheduled to terminate in September 1984, but the contract provides for two 1-year extensions. DOE plans to consolidate the functions of several contractors, including POSSI, under a new management, operations, and maintenance contractor. DOE asked POSSI to estimate the cost for one, or possibly two, 6-month extensions so that the termination of POSSI's contract could coincide with the start of the new management, operations, and maintenance contract.

On February 10, 1984, POSSI gave DOE an estimate that reappraised the cost of the base contract and estimated the cost for each of the 6-month extensions. POSSI's estimate was \$181 million for the base contract and \$44 million and \$39 million for the first and second 6-month extensions, respectively, for a total cost of \$264 million. This estimate contrasts with the original estimates made at the time POSSI and DOE signed the contract in December 1981. At that time POSSI estimated that the base contract would cost \$141 million and a 1-year extension would cost \$52 million for a total of \$193 million. According to a Project Office contracts specialist, the primary reason for the added cost to the contract is that POSSI has responded to about 150 technical directives that DOE has issued over the past 2 years.

DOE has not renegotiated costs with POSSI since the inception of the contract, even though POSSI gave DOE new cost estimates in 1983. Also, POSSI's February 1984 estimates may change because they do not include added costs associated with at least 26 recent DOE technical directives. We will report on the POSSI contract negotiations in subsequent quarterly reports as information becomes available.

¹¹Status of Strategic Petroleum Reserve Activities as of December 31, 1983 (GAO/RCED-84-92, Jan. 13, 1984).

OTHER ISSUES

During our review, we obtained information on the following aspects of the SPR program:

- Operations Office's (1) schedule for implementing the recommendations of its baseline report and (2) release in March 1984 of its report on allegations about mismanagement or misconduct within the SPR program,
- results of a U.S. Attorney/DOE Inspector General investigation into allegations about the diversion of SPR oil and substitution of inferior or waste oil,
- DOE's program to analyze oil in filled storage caverns, and
- SPR program's compliance with the Cargo Preference Act of 1954.

Operations Office reports

As discussed in our last quarterly report, the Operations Office issued its report, Baseline Assessment of the SPR Project Management Office, in October 1983. The Operations Office concluded that significant progress had been made in developing and filling the SPR and that the New Orleans Project Office had played a significant role in the accomplishments. However, its report identified numerous problems in the SPR project and recommended that 170 corrective actions be taken. These recommendations predominantly seek to redirect overall SPR priorities, realign Project Office and contractor responsibilities, and implement existing DOE procedures.

On January 16, 1984, the chairman of the Operations Office task force approved the plan to implement the recommendations of the Baseline Assessment report. As of March 31, 1984, DOE reported that 81 recommendations, or 48 percent, had been fully implemented and 89 recommendations were still being acted upon. According to the task force's implementation plan, 124 recommendations were scheduled for completion by March 31, 1984.

On March 19, 1984, the Operations Office issued a second report, Review of Allegations Regarding the Strategic Petroleum Reserve Program. The Operations Office task force considered 720 allegations of mismanagement or misconduct from 151 sources. (The allegations did not include issues currently under investigation by the Inspector General.) It found that fundamental problems developed early in the SPR program and persisted over the years, affecting virtually every functional area of management. Additionally, the task force found that, while identified problems were acted upon in some fashion, the SPR system of management control did not ensure that reported problems were adequately addressed and corrected so as to avoid recurrence.

Of the 720 allegations, the task force stated that 567 (79 percent) had been closed. The Project Office had taken action on 366 allegations. Other allegations had been closed because the organization involved was no longer working on the project and the allegation did not involve fraud, theft, or disputed costs; practices and procedures had changed; or the allegations could not be substantiated. The task force made 25 recommendations to address the remaining 153 allegations (21 percent). It concluded that the SPR's management system "is being (and will be) substantially strengthened to meet all appropriate requirements" by implementing the recommendations of the Baseline Assessment and the Allegations Report, application of all appropriate DOE management directives, and implementation of a disciplined followup program on all corrective actions.

The task force also was requested to inventory all SPR property, product, and accounts. It found that the personal property inventories of four smaller contractors were acceptable, but it identified deficiencies in the property management systems of the following four contractors: Wells Fargo Guard Service, Thacker Construction Company, Walk-Haydel and Associates, and Jacobs D'Appolonia Engineers. The task force reported that POSSI has completed its reconciliation of the property transfer from Dravo Utility Constructors, Inc. (the previous operations and maintenance contractor). POSSI identified property valued at \$548,727 on the Dravo records that it could not locate and it located property valued at \$2,231,671 that was not on the Dravo records.¹²

Investigation of Bayou Choctaw oil quality is closed

On March 30, 1984, the Inspector General issued its report, Allegations of Diversion and Substitution of Crude Oil, Bayou Choctaw Storage Site, Strategic Petroleum Reserve (DOE/IG-0205, March 30, 1984). The report closes the federal government's investigation into allegations that, between November 1977 and December 1978, large quantities of crude oil destined for the SPR were diverted to private use and inferior or waste oil was substituted to conceal the shortages. The crude oil in question had been moved by barges from an SPR marine terminal to the Bayou Choctaw storage site. (The site was subsequently connected to DOE's current marine terminal at St. James by a pipeline.)

The United States Attorney for the Middle District of Louisiana directed and controlled the investigation and received assistance from the Inspector General and the U.S. Customs Service Office of Investigation. The Inspector General's report stated that on January 10, 1984, the United States Attorney declined prosecution in the case. It reported that no aspect of the investigation resulted in evidence substantiating the allegations or indicating a violation of federal law.

¹²Operations Office officials told us that they have furnished specific details of the reconciliation to the Chairman, Senate Committee on Energy and Natural Resources.

Storage cavern oil analysis

As part of its storage cavern inventory and integrity control program, the Project Office requires that an analysis of the oil in each storage cavern be conducted about 4 months after it has been filled and every 5 years thereafter. POSSI takes oil samples at six different cavern levels, and the sampling is witnessed by the Project Office's oil quality assurance specialist. The samples are divided so that half is sent to the National Institute for Petroleum's laboratory at Bartlesville, Oklahoma, for analysis and half is retained at the storage site.

As of March 31, 1984, DOE had sampled 11 caverns. Table 10 in appendix III shows a composite of the laboratory analysis of the specific gravity and sulfur content for the oil in each cavern. During the next quarter, DOE plans to sample the Weeks Island salt mine and 6 more salt caverns.

Cargo Preference Act compliance

SPR oil deliveries are subject to the Cargo Preference Act of 1954. The act requires that the SPR program, as a government procurement program using ocean-going vessels, transport at least 50 percent of the oil in commercial U.S.-flag tankers (tankers registered in the United States). DOE and the Maritime Administration, the agency in the Department of Transportation that administers the Cargo Preference Act, have agreed to use long ton-miles to measure compliance. (Long ton-miles combine both the amount of oil carried and the distance the oil is moved.)

DOE and the Maritime Administration in the past have disagreed about various other aspects about measuring cargo preference compliance. In October 1982, the Secretary of Energy and the Secretary of Transportation agreed to ask the Attorney General of the United States to determine whether commercial U.S.-flag oil shipments from Alaska to the SPR may be counted toward the 50 percent U.S.-flag cargo preference share¹³. On September 15, 1983, the Assistant Attorney General for Legal Counsel concluded that shipments of Alaska oil on commercial U.S.-flag tankers may be counted toward DOE's compliance with the Cargo Preference Act. As a result, the SPR program was credited with an additional 27.2 billion long ton-miles, which raised its percentage of U.S.-flag tanker usage in 1981 and 1982 from 39 percent to 52 percent.

Table 11 in appendix III shows the SPR program's compliance totals for each year since the program's inception. Overall, about 49 percent of the long ton-miles were via U.S.-flag tankers. Since the beginning of 1981, 54 percent of the long ton-miles were via U.S.-flag tankers.

¹³These shipments are between two U.S. ports and are therefore subject to the Jones Act of 1920, which requires all cargoes moving between two U.S. ports to be carried in U.S.-flag vessels.

ALTERNATIVE SPR OIL ACQUISITION STRATEGIES

In 1977 DOE's predecessor, the Federal Energy Administration, and the Department of Defense signed an interagency agreement which authorized Defense Fuel Supply Center, a Department of Defense agency, to buy crude oil for the SPR. Since oil acquisition began, DFSC has purchased about 253 million barrels of oil, or 64 percent of the SPR oil, through long-term contracts and on the crude oil spot market.

While DFSC has acquired most of the SPR oil through long-term and spot market purchases, DOE program office personnel periodically have assessed and used alternative SPR oil acquisition strategies. In particular, they have assessed contracting with the national oil companies of oil producing countries, using Elk Hills Naval Petroleum Reserve (NPR) crude oil, and/or using federal royalty oil to fill the SPR. In 1980, DOE used a competitive exchange program for NPR oil to acquire 36.7 million barrels of oil for the SPR. In 1981 and 1982, DOE signed two contracts to buy oil from PEMEX, the Mexican national oil company. As of March 31, 1984, DOE had acquired 100 million barrels of oil through the PEMEX contracts. DOE has not used federal royalty oil for the SPR.

DOE does not plan to use either NPR or federal royalty oil to fill the SPR in the near future. This is because of (1) the current ready availability of crude oil on the spot and long-term markets and (2) logistical difficulties and administrative burden in transporting NPR or federal royalty oil directly to the SPR or using the oil as part of a competitive exchange for other crude oil that would be delivered to the SPR.

CONTRACTS WITH FOREIGN
GOVERNMENT OIL COMPANIES

Around 1977, DOE began investigating the feasibility of using sole-source contracts with the national oil companies of oil producing countries as a means of acquiring SPR crude oil. DOE's General Counsel concluded that DOE has the legal authority to negotiate and contract with foreign governments for oil. However, the General Counsel noted that such a sole-source procurement would be noncompetitive and, therefore, require justification. DOE recognized that price alone would not be sufficient justification for a sole-source contract. However, DOE's General Counsel determined that price in combination with international economic and political considerations, and the unique capability of a particular seller to avoid market perturbations, could constitute a sound justification. DOE's General Counsel concluded that the issue of justification for a noncompetitive procurement would have to be judged on a case-by-case basis.

DOE also examined whether the terms of a sole-source contract with a producing country's national oil company could be kept confidential if foreign governments required this as a condition for granting a price discount. The analysis concluded

that the only way to prevent disclosure would be to classify the contract, which DOE said would be feasible.

Since the time of these studies, DOE has had contacts with various foreign national oil companies concerning SPR oil purchases. DOE successfully negotiated two sole-source contracts with PEMEX. It has not negotiated with other producing countries' oil companies mainly because of differences about the quality or the price of the oil that DOE would consider buying.

NAVAL PETROLEUM RESERVE OIL

The Elk Hills NPR is a federal reserve located near Bakersfield, California. It is currently the second largest producing oil field in the United States. Elk Hills has six zones, but the majority of its crude oil comes from the Stevens Zone which produces a high quality crude (about 35 degrees API gravity and between 0.47 and 0.55 percent sulfur¹) that generally meets the SPR oil quality specifications for sweet crude oil.

The Stevens Zone is jointly owned by the U.S. government and Chevron Oil Company. The government owns 79.6 percent of the oil produced from the Stevens Zone. This share averaged about 102,764 barrels per day in fiscal year 1983. DOE's Office of Naval Petroleum and Oil Shale Reserves oversees the government's share of the Elk Hills NPR.

In September and October 1980, DOE used Elk Hills oil to acquire about 36.7 million barrels of oil for the SPR. The government's share was offered in a competitive sale for the exchange of an equal amount of oil for the SPR, DOE considered using NPR oil to fill the SPR in fiscal year 1982. In a memorandum dated July 2, 1981, DOE's Acting Assistant Secretary for Environmental Protection, Safety, and Emergency Preparedness advised the Secretary of Energy that he planned to acquire SPR oil from open crude oil market procurements and use NPR oil only during tight oil market conditions. The Acting Assistant Secretary concluded that this strategy was the most favorable, considering the then-current world petroleum supply situation, because it would result in the widest range of industry competition for both SPR purchases and NPR sales.

In 1980, DOE also contracted with Pacific Refining Company to acquire about 700,000 barrels of NPR oil. In January 1982,

¹The oil industry uses degrees of American Petroleum Institute (API) gravity to measure an oil's specific gravity. API gravity measures the mass of a fluid relative to water and ranges from 10 degrees for very heavy crude oil to 45 degrees for very light crude oil. The SPR oil quality specification for sweet crude oil is a maximum of 0.5 percent sulfur content. For some shipments, DOE would probably have to make an exception to its quality specifications in order to categorize the Stevens Zone oil as sweet.

the SPR Program Office signed a Memorandum of Understanding with DOE's Office of Naval Petroleum and Oil Shale Reserves for all available Elk Hills NPR oil in excess of contractual and equity requirements between February 1, 1982, and April 4, 1982. The SPR program received about 500,000 barrels of NPR oil as a result.

DOE has not acquired any additional Elk Hills NPR oil for the SPR. However, the SPR Program Office analyzed the cost effectiveness of acquiring Elk Hills Stevens Zone oil before DOE offered it for competitive sale in July 1983 and December 1983.

On August 5, 1983, DOE's Office of Naval Petroleum and Oil Shale Reserves closed its solicitation to competitively sell 88,000 barrels per day of Stevens Zone crude oil for delivery between October 1983 and March 1984. An internal SPR Program Office memorandum, dated July 21, 1983, reported the results of a comparison of the costs to acquire and transport Stevens Zone crude oil to the SPR and the costs to acquire and transport foreign sweet crude oil through DFSC's spot market solicitation. The comparison estimated the cost of the Stevens Zone crude oil transported overland² to be between \$29.93 and \$33.58 per barrel, depending on the competitive bid price for the NPR oil, and the cost of imported sweet crudes to be \$32.35 per barrel. The SPR program official responsible for the analysis stated that the SPR program decided not to acquire Stevens Zone crude oil because there was no perceived cost advantage--especially at that time, when there was an abundant supply of foreign sweet crude oil available on the spot market.

On January 10, 1984, the DOE Office of Naval Petroleum and Oil Shale Reserves closed its solicitation to competitively sell 90,000 barrels per day of Stevens Zone crude oil for delivery between April and October 1984. The SPR Program Office again assessed the feasibility of acquiring a portion of the Stevens Zone crude oil for the SPR but decided against it. According to an SPR Program Office memorandum dated January 1, 1984, the cost to acquire and transport the Stevens Zone crude oil offered no price advantage. The cost of Stevens Zone crude oil was compared to current DFSC spot market purchases of slightly higher quality foreign sweet crude oils. The memorandum stated that the cost of Stevens Zone crude oil was approximately \$30.41 per barrel while the foreign sweet crude oils ranged from \$29.75 to \$31.00 per barrel. The January 1, 1984, memorandum also stated that the SPR Program Office would continue to assess the feasibility of using Stevens Zone crude oil to fill the SPR.

²DOE's July 1983 analysis considered only the overland transportation option. This is because DOE had previously found that moving NPR oil by pipeline to Los Angeles and then via tankers to the SPR would result in a loss of NPR oil quality due to commingling with lower quality crudes.

FEDERAL ROYALTY OIL

The Department of the Interior is responsible for leasing offshore and onshore federal lands for oil and natural gas exploration and production. One of the provisions of these leases is that, if the lease produces oil or natural gas, the federal government is entitled to royalty payments on the oil or gas produced. The Mineral Leasing Act of 1920, as amended (30 U.S.C. 223), and the Outer Continental Shelf (OCS) Lands Act (43 U.S.C. 1337) set a statutory minimum of 12.5 percent of production for royalties, although the actual amount can be higher.

The Secretary of the Interior can elect to take the government's royalty share in currency or "in kind," that is, in crude oil and/or natural gas. Since 1946, the federal government has offered to sell its royalty-in-kind share to refiners that do not have access to adequate supplies of oil at equitable prices. The royalty-in-kind program provides a steady, secure source of offshore and onshore domestic crude oil to these refiners.

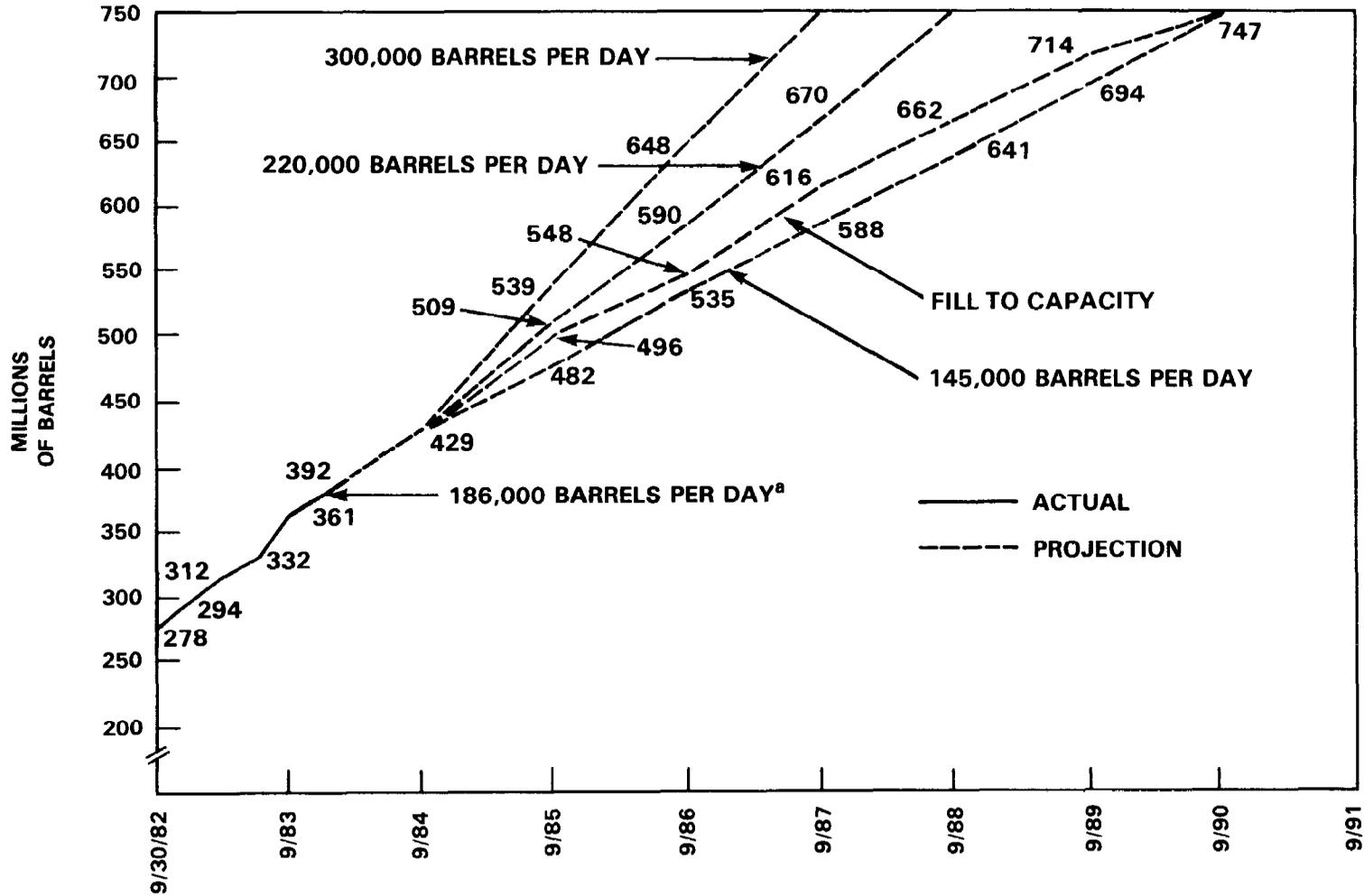
DOE has considered acquiring the government's share of OCS royalty oil for the SPR. In October 1980, DOE recommended that this option be deferred until after the expiration of oil price controls, mainly because the expiration of price controls would eliminate economic benefits to current OCS oil recipients--particularly small refiners. DOE determined that the use of royalty oil for the SPR would adversely affect small refiners, lessees, and major refiners by disrupting secure, long-standing oil supply relationships and by forcing them to obtain crude oil at higher spot market prices.

DOE also concluded that an option to supply OCS oil directly to the SPR would be logistically difficult because no pipelines go directly from the approximately 40 marine terminals that receive OCS oil to the SPR sites. DOE rejected an exchange agreement option because of the complicated logistics and the accompanying administrative difficulties in arranging the transfer of OCS oil from numerous lessees and small refiners.

In January 1981, the President removed federal oil price controls, thereby eliminating the OCS oil price benefits for small refiners. However, DOE has not formally reevaluated using OCS royalty oil to fill the SPR. According to the director of systems in DOE's SPR Program Office, the use of OCS oil would entail logistical difficulties and administrative burden. This would tend to increase the SPR's oil acquisition cost and would make royalty oil economically less attractive if oil is readily available on the spot market.

FIGURES AND TABLES ON THE STATUS OF THE
STRATEGIC PETROLEUM RESERVE

FIGURE 1: COMPARISON OF FILL RATES IN REACHING 750 MILLION BARRELS



^aTHE DEPARTMENT OF INTERIOR AND RELATED AGENCIES FISCAL YEAR 1984 APPROPRIATION ACT (PL98-146) REQUIRES A MINIMUM FISCAL YEAR 1984 FILL RATE OF 186,000 BARRELS PER DAY

Table 1
Comparison of Fill Schedules and
Storage Requirements in Reaching 750 Million Barrels

Fiscal year	Fill to available storage capacity ^a	300,000 barrels per day after fiscal year 1984 ^b		220,000 barrels per day after fiscal year 1984 ^b		145,000 barrels per day after fiscal year 1984 ^c	
		Oil volume	Storage requirements ^d	Oil volume	Storage requirements ^d	Oil volume	Storage requirements ^d
----- (millions of barrels) -----							
1984	430	429	+1	429	+1	429	+1
1985	496	539	-43	509	-13	482	+14
1986	548	648	-100	590	-42	535	+13
1987	616	750	-134	670	-54	588	+28
1988	662		-88	750	-88	641	+21
1989	714		-36		-36	694	+20
1990	750					750	
1991							

22

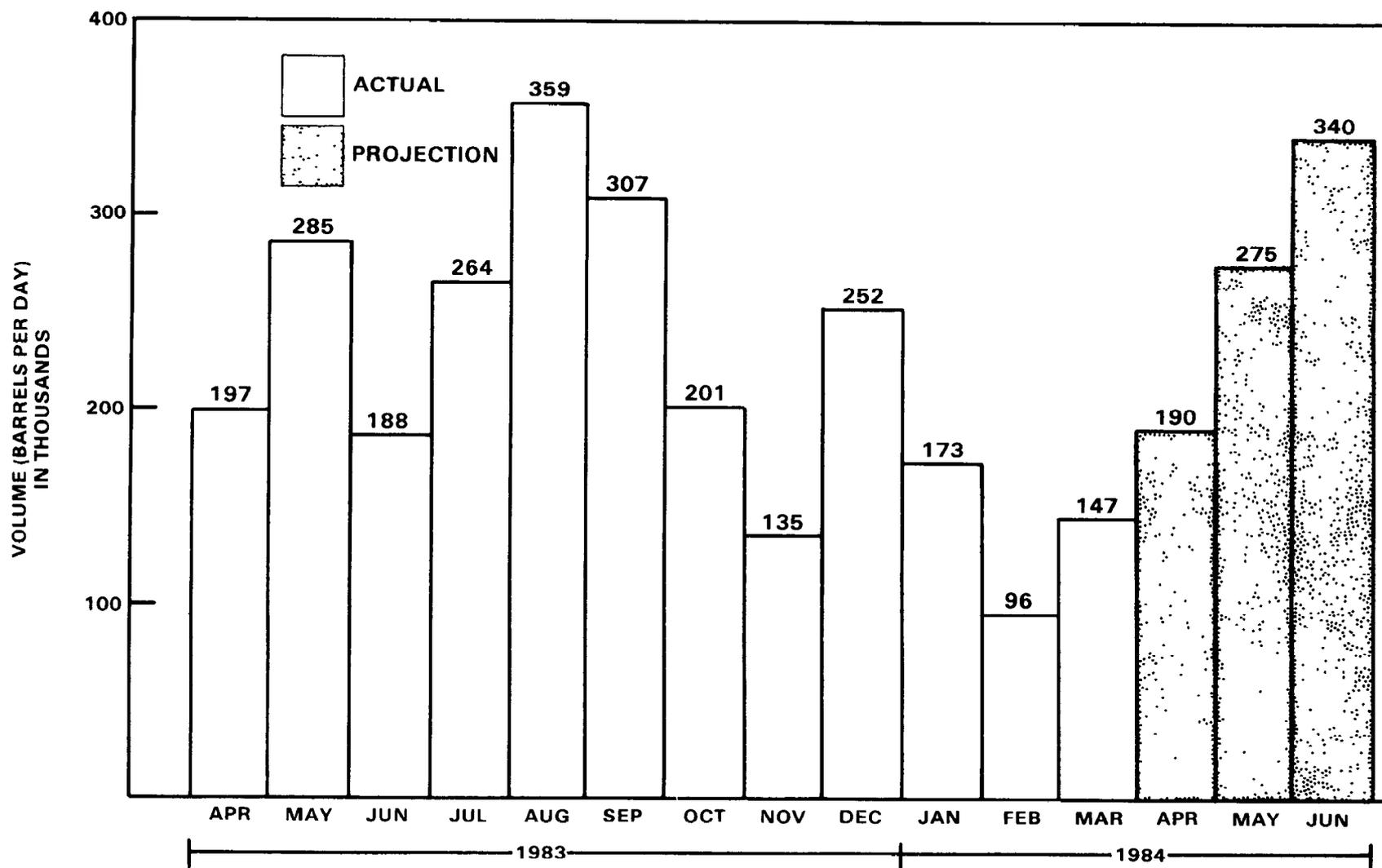
^aThe available storage capacity is the amount that the administration's fiscal year 1985 budget shows will be available at the end of each fiscal year.

^bFor fiscal year 1984, a minimum fill rate of 186,000 barrels per day is required by the Department of the Interior and Related Agencies Appropriations Act (P.L. 98-146). However, the Energy Emergency Preparedness Act requires a minimum average annual fill rate of 300,000 barrels per day until at least 500 million barrels of oil are stored. The act also allows a lower rate if the President finds the 300,000 barrel per day rate not to be in the national interest. With the presidential finding, the act requires a minimum rate of at least 220,000 barrels per day, or the highest practicable fill rate achievable with available funds.

^cThe administration's fiscal year 1985 budget proposes to fill the SPR at 145,000 barrel per day rate until the SPR is filled in early fiscal year 1991.

^dA positive amount indicates excess capacity available while a negative number indicates that additional storage is needed.

Source: DOE and GAO calculations.

FIGURE 2: AVERAGE DAILY SPR RECEIVING RATE^a

^aDAILY RECEIVING RATES FOR APRIL, MAY, AND JUNE 1984, ARE BASED ON DOE PROJECTIONS OF FUTURE DELIVERIES AND ARE SUBJECT TO CHANGE

Table 2
Oil Volume Stored
by Fiscal Year 1984 Quarter

<u>Quarter</u>	<u>Oil volume</u> <u>at start</u>	<u>Deliveries</u>	<u>Oil volume</u> <u>at end</u>	<u>Average receiving rate</u>	
	<u>of quarter</u>		<u>of quarter</u>	<u>For</u> <u>quarter</u>	<u>Since</u> <u>10/01/83</u>
	- - -(millions of barrels)- - - -			(thousands of barrels per day)	
Oct. 1, 1983 through Dec. 31, 1983	361.0	18.1	379.1	196.7	196.7
Jan. 1, 1984 through March 31, 1984	379.1	12.7	391.8	139.6	168.3

Source: DOE.

Table 3
Summary of Oil Deliveries
for Fiscal Year 1984

	<u>Oil deliveries</u> <u>for quarter</u> <u>ending 3/31/84</u>	<u>Oil deliveries</u> <u>for FY 1984</u> <u>as of 3/31/84</u>	<u>Oil under</u> <u>contract as</u> <u>of 3/31/84^a</u>	<u>Oil to be</u> <u>contracted^b</u>	<u>Total</u>
------(millions of barrels)-----					
Open, continuous solicitation ^c	6.9	17.9	8.3	20.4	46.6
PEMEX contract	4.2	8.5	9.9	----	18.4
Term contracts					
Shell International Trading Co.	1.0	2.5	----	----	2.5
BP Oil International Ltd.	<u>0.6</u>	<u>1.9</u>	----	----	<u>1.9</u>
Total	<u>12.7</u>	<u>30.8</u>	<u>18.2</u>	<u>20.4</u>	<u>69.4</u>

^aRepresents the amount of oil that is under contract and to be delivered in fiscal year 1984.

^bRepresents the amount of oil that remains to be contracted for and delivered in fiscal year 1984.

^cThe open, continuous solicitation involves making contract awards without reissuing the solicitation for offers of oil that is available on the "spot," or short-term, market. (See table 4 for individual contract awards.)

Source: DOE.

Table 4Open, Continuous Solicitation Awards for
Quarter Ending March 31, 1984

<u>Contract date</u>	<u>Supplier</u>	<u>Oil type^a</u>	<u>Total barrels</u> (millions)
1/11/84	Bomar Oil, Inc.	sweet	.85
1/11/84	Carey Petroleum Ltd.	sour	.05
1/11/84	Coastal States Trading	sour	.70
1/11/84	Derby & Company, Inc.	sweet	.53
1/24/84	Exxon International Company	sweet	1.92
2/07/84	Phibro Energy, Inc.	sweet	.53
2/22/84	BP Oil Development Ltd.	sweet	1.00
2/22/84	Coastal States Trading	sour	.35
3/06/84	Phibro Energy, Inc.	sweet	2.28
3/21/84	Carey Petroleum Ltd.	sweet	.50
3/21/84	BP Oil International Ltd.	sweet	1.75
3/21/84	Phibro Energy, Inc.	sour	<u>1.85</u>
Total			<u><u>12.31</u></u>

^aDOE established quality specifications for SPR oil, including a range from .5 percent to 1.99 percent sulfur content for sour crudes and a maximum of .5 percent sulfur content for sweet crudes.

Source: DFSC.

Table 5

Total SPR Deliveries by Crude
Type as of March 31, 1984

	<u>Type Ia</u> ^a	<u>Types II-V</u> ^b	<u>Type VI</u> ^c	<u>Type VIa</u> ^d	<u>Maya</u> ^e	<u>Total</u>
	- - - - - (millions of barrels) - - - - -					
Volume delivered	191.4	141.1	31.4	16.6	11.3	391.8
	- - - - - (percent) - - - - -					
Percentage of total oil delivered	49	36	8	4	3	100

^aHigh-sulfur crude (from .5 to 1.99-percent sulfur content) with an API gravity range of 30 to 36 degrees. Type I oil includes Arabian Light and Isthmus crudes.

^bHigh-quality crudes with a low sulfur content (maximum .5-percent sulfur content and an API gravity range of 30 to 45 degrees. These types include some North Sea and West African crudes.

^cType VI was established for Alaskan North Slope crude, an intermediate-sulfur crude (maximum 1.25-percent sulfur content) with an API gravity range of 26 to 30 degrees.

^dType VIa was established for the Maya/Isthmus blend under the PEMEX contract. The blend is a high-sulfur mixture with an API gravity of at least 28 degrees.

^eMaya crude is a lower quality oil which has a maximum sulfur content of 3.5 percent and an API gravity of at least 22 degrees.

Source: DOE.

Table 6Status of SPR Underground Capacity
as of March 31, 1984

<u>Storage facilities</u>	<u>Capacity available</u>	<u>Capacity filled</u>
Phase I sites: (permanent capacity)	----- (millions of barrels) -----	
Bayou Choctaw	46.6	45.4
Bryan Mound	66.0	64.4
Sulphur Mines	26.3	26.0
Weeks Island	73.0	73.0
West Hackberry	<u>48.8</u>	<u>48.7</u>
Total	<u>260.7</u>	<u>257.5</u>
Phase II sites: (planned capacity)		
Bayou Choctaw	10.0	(a)
Bryan Mound	120.0	86.9
West Hackberry	<u>160.0</u>	<u>44.7</u>
Total	<u>290.0</u>	<u>131.6</u>
Tanks and pipelines	<u>-</u>	<u>2.7</u>
Total for SPR	<u><u>550.7</u></u>	<u><u>391.8</u></u>

^aA newly leached cavern with 4.5 million barrels of usable capacity will be exchanged for an existing 10-million-barrel cavern owned by Allied Chemical Corporation at the Bayou Choctaw site after leaching is completed. DOE currently expects to complete leaching in August 1984.

Source: DOE.

Table 7

Summary of Leaching Activities
for Quarter Ending March 31, 1984^a

	<u>Brine disposal</u>		<u>Cumulative oil capacity^b</u>	
	<u>Baseline</u>	<u>Actual</u>	<u>Baseline</u>	<u>Actual</u>
	(thousands of barrels per day)		(millions of barrels)	
Bryan Mound:				
January	900	799	75.7	79.2
February	900	479	79.5	79.5
March	900	743	83.4	80.3
West Hackberry:				
January	900	499	44.8	39.9
February	900	802	47.9	40.8
March	900	916	51.6	44.7
Bayou Choctaw:				
January	53	50	3.9	3.9
February	53	48	4.1	4.1
March	53	53	4.4	4.4

^aThis table compares the actual leaching activities with baselines that have been established for the SPR contractor. To allow for contingencies, the contractor baselines are more stringent than the overall baselines established for the SPR program.

^bCumulative oil capacity represents the amount of cavern volume available for storing oil. The figures shown for Bayou Choctaw represent the cumulative leached volume because the activities at Bayou Choctaw are directed at creating a cavern that will not store oil but will be exchanged for a larger existing cavern owned by Allied Chemical Corporation.

Source: DOE.

Table 8

Status of the SPR Petroleum Account
as of March 31, 1984^a

<u>Funds made available</u>	<u>Amount</u> (millions)
Carryover from fiscal year 1981	\$1,806
Fiscal year 1982 appropriations	3,684
Fiscal year 1983 appropriations	2,074
Fiscal year 1984 appropriations	<u>650</u>
Total made available	<u>\$8,214</u>
 <u>Funds used or committed</u>	
Fiscal year 1982 payments	\$3,687
Fiscal year 1983 payments	1,641
Estimated fiscal year 1984 payments as of 3/31/84 ^b	1,051
Estimated DOE unpaid obligations as of 3/31/84 ^c	<u>1,387</u>
Total used or committed	<u>\$7,766</u>
Estimated unobligated funds at DOE	<u>\$ 447</u>

^aThe SPR Petroleum Account was established in October 1981 to pay for petroleum acquisition and transportation. This is an off-budget account.

^bAmount consists of DOE's actual reported payments through February 1984 and DOE's estimated payments for March 1984.

^cUnpaid obligations represent funds that have been committed to pay for fiscal year 1984 oil deliveries under the first PEMEX contract, or are obligated to DFSC for upcoming oil deliveries or purchases, and expected transportation costs. DFSC estimates that of the funds obligated to it, about \$366.9 million is available as of March 31, 1984, for future purchases. DOE is in the process of obligating an additional \$250 million to DFSC.

Source: DOE and DFSC.

Table 9The National Petroleum Council's SPR Committee:
Task Group ResponsibilitiesSPR facilities task group

- Identify volume and pumping capabilities and reliability.
- Discuss batching flexibility.
- Discuss storage cavern leaching rates.
- Discuss berthing and deballasting facilities.
- Discuss metering requirements.
- Discuss dispersion of layers of stored oil due to thermal characteristics of salt domes.

Refiners task group

- Identify current crude mix.
- Identify current refinery capabilities.
- Identify refining centers,
- Discuss testing procedures for SPR oil.
- Discuss types of crude oil for SPR storage.

Distribution task group

- Describe overland crude oil transportation system that could be used for SPR distribution.
- Identify capacities, current throughputs, and flexibilities of the systems.
Discuss role of exchange agreements in the distribution of SPR oil.
- Discuss Standard Sales Provisions for SPR oil.

Marine task group

- Inventory readily available U.S. tankers.
- Inventory readily available foreign tankers.
- Identify potential berths and their characteristics.
- Discuss improvements to dock facilities for use by a greater number of tankers.
- Discuss regulatory changes that might be required in an emergency.

Source: National Petroleum Council.

Table 10Results of Laboratory Analysis
of Filled SPR Caverns

<u>Storage site</u>	<u>Cavern number</u>	<u>Type of oil^a</u>	<u>Degrees API gravity^b</u>	<u>Percent sulfur content</u>
Bayou Choctaw	15	Sour	33.0	1.54
	19	Sour	33.0	1.60
West Hackberry	6	Sour	32.3	1.73
	7	Sweet	37.0	0.34
	8	Sour	33.2	1.61
	11	Sour	33.1	1.67
Bryan Mound	1	Sweet	36.6	0.34
	2	Sweet	35.9	0.23
	4	Sweet	35.3	0.32
	5	Sweet	36.2	0.34
	106	Maya	22.4	3.25

^aDOE established sulfur content specifications for SPR oil. Sweet oil has a maximum of .5 percent sulfur, sour oil has a range from .5 percent to 1.99 percent sulfur, and Maya oil has maximum of 3.5 percent sulfur.

^bThe oil industry uses degrees of American Petroleum Institute (API) gravity to measure an oil's specific gravity. API gravity measures the mass of a fluid relative to water and ranges from 10 degrees for very heavy crude to 45 degrees for very light crude.

Source: DOE

Table 11The SPR Program's Compliance With
The Cargo Preference Act^a

	<u>U.S. flag</u>		<u>Foreign flag</u>	
	<u>Long ton-miles</u>	<u>Percent</u>	<u>Long ton-miles</u>	<u>Percent</u>
	(billions)		(billions)	
1977	1.4	16	7.2	84
1978	27.1	54	23.4	46
1979	2.8	30	6.6	70
1980	1.8	11	14.9	89
1981	41.0	45	49.3	55
1982	29.0	63	16.7	37
1983 ^b	<u>20.9</u>	<u>62</u>	<u>13.0</u>	<u>38</u>
Total 1981-83	90.9	54	79.0	46
Total 1977-83	124.0	49	131.1	51

^aDOE and the Maritime Administration have agreed to measure compliance using long ton-miles, which factors in both the quantity of oil being delivered and the distance the oil is moved.

^bPreliminary data. The Maritime Administration verifies the DOE data on a voyage-by-voyage basis.

Source: DOE.

Table 12Prior GAO Quarterly Reports

1. Progress in Filling the Strategic Petroleum Reserve Continues, but Capacity Concerns Remain (GAO/EMD-82-112, July 15, 1982).
2. Status of Strategic Petroleum Reserve Activities as of September 30, 1982 (GAO/RCED-83-29, Oct. 15, 1982).
3. Status of Strategic Petroleum Reserve Activities as of December 31, 1982 (GAO/RCED-83-93, Jan. 14, 1983).
4. Status of Strategic Petroleum Reserve Activities as of March 31, 1983 (GAO/RCED-83-136, Apr. 15, 1983).
5. Status of Strategic Petroleum Reserve Activities as of June 30, 1983 (GAO/RCED-83-203, July 13, 1983).
6. Status of Strategic Petroleum Reserve Activities as of September 30, 1983 (GAO/RCED-84-11, Oct. 14, 1983).
7. Status of Strategic Petroleum Reserve Activities as of December 31, 1983 (GAO/RCED-84-92, Jan. 13, 1984).

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